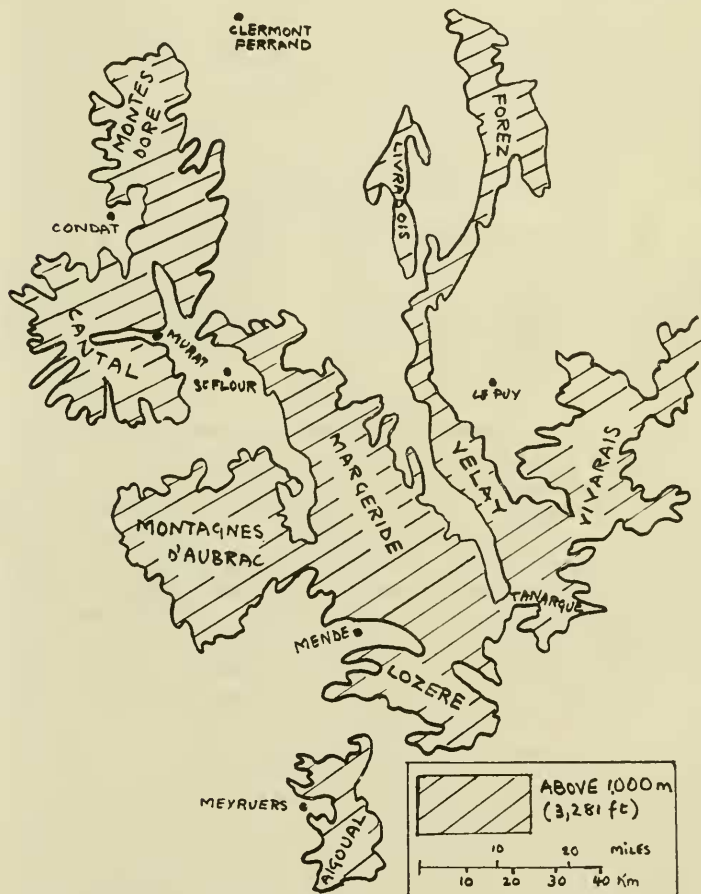


Notes on the *Erebia* of the French Massif Central

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INTRODUCTION

Only the higher areas of the Massif Central reach sufficient altitude to provide suitable habitat for most *Erebia*. The map shows those areas in excess of 1,000 metres. The Montes Dore and the Cantals in the north west are the most mountainous. Puy de Sancy, 1,885 m, in the Montes Dore is the highest point in the Massif, Plomb du Cantal, 1,855 m, is almost as high and both areas have a number of other peaks over 1,800 m.



The Margeride running south east from the Cantals is lower reaching its highest at its southern end. This area is high moorland rather than mountain. Large areas like the Plateau du Palais du Roi are over 1,400 m. The Aubracs to the west are also not really mountainous but high downland reaching 1,450 m in places. Mont Lozere south of the Margeride is

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higher, attaining almost 1,700 m. Further to the south and isolated from the other higher areas of the Massif, Mont Aigoual is 1,565 m.

East of the Margeride the Monts de Velay are lower, 1,421 m at their highest point. To the south the Tanargue and Bauzon are over 1,500 m. The highest point outside the Montes Dore and the Cantals is Mont Mezenc, 1,753 m, in the Vivarais and Gerbier de Jonc, 1,551 m, lies just to the south of it. This leaves only the Forez and the Livradois to the north. The latter only reach 1,100 m, but the Forez reaches 1,634 m at Pierre Sur Haute.

Literature on the Massif often refers to two other areas, firstly the Auvergne, this was one of the old Provinces of France and in relation to the areas mentioned above includes only the northern part, namely Montes Dore and Cantal. The second area is the Cevennes, this is the south eastern fringe of the massif, mainly at a lower level but including Mont Aigoual, Mont Lozere and extending north as far as the Tanargue.

The Massif Central is entomologically less well explored than the Alps and Pyrenees, but in many ways is no less interesting. Warren (1936) left large gaps in his information on the Massif and some of these remain to be filled. The following notes, while not dealing with all the *Erebia* species occurring in the area, may help to extend the currently published information on some species.

Erebia ligea Linn.

This species illustrates the lack of information available to Warren. He states that it does seem to have been recorded west of the Rhone, whereas it is in fact widespread in the Massif and common in some localities. De Lesse (1947) lists a number of localities for it in the Massif, Mont Dore, Lioran (Cantal), Forez, Margeride, Gerbier de Jonc, Foret de Mazan (Ardeche). I have found it in the Valley de Chaudfour, Monte Dore (24th July, 1974), on the eastern side of Plomb du Cantal (23rd July, 1975), Plateau du Palais du Roi (11th August, 1975) and further south in Ardeche than recorded by de Lesse at Col de Meyrand (27th July, 1972). In addition, however, I have also found it in some numbers near Aubrac, Montagnes d'Aubrac, an area from which it does not seem to have been previously recorded. Its range thus extends south west into the Department of Aveyron.

De Lesse classified *ligea* from the Massif as ssp. *carthusianorum* Frhst. The form from the Massif tends however to be small, especially those from the Plateau du Palais du Roi. Higgins and Riley (1970) give the male forewing measurement of this species as 24/27 mm, while my series from this locality average only 23 mm with some individuals as small as 20 mm. Those from Aubrac average 24 mm and those from Plomb du Cantal 25 mm. Figures 7 and 10 show a pair from Aubrac.

Erebia euryale Esp.

De Lesse lists the following localities for this species, Forez, Lac du Bouchet (Velay), Montes Dore, Lioran (Cantal). I

found it common on Puy de la Tache, Montes Dore (20th July, 1975), also on Plomb du Cantal (27th July, 1974) and on Puy Mary, Cantal (12th August, 1975). Its range is, however, more extensive than that shown by de Lesse as it occurs further south both on the east and west side of the Massif. In the east I found it near Col de Meyrand, Tanargue (28th July, 1972) and in the west near Aubrac (24th July, 1975).

Based on what would seem to have been an original misconception by Fruhstorfer, Warren gives the subspecies from the Auvergne as *adyte* f. *phoreta* Frhst. I have however found no specimens in the Massif that could be considered to be *adyte*. Bretherton (1966) states that ssp. *isarica* Heyne occurs in the Auvergne and also that ssp. *antevortes* Vty. is found very locally in the Massif. However, while there is substantial variation between individual specimens in each locality where I have encountered this species, I can find no evidence to suggest the presence of two separate subspecies. De Lesse (1947) therefore seems correct in his view that all specimens from the Massif are referable to ssp. *antevortes*.

Individual specimens range from those with the upperside marking reduced to very small elliptical rings round the ocelli on the forewings and two or three very small spots on the hindwings, to those with a well developed band on both wings. The latter are however rare and specimens with well developed markings on the forewings usually have more poorly marked hindwings, a row of well separated spots rather than a band. The undersides are typical *antevortes* with the silvery bands almost completely absent on the hindwings and the hindwing spots reduced or absent. Although both well and poorly marked specimens occur together wherever I have found this species, the proportion of specimens with very reduced markings is higher in my series from Montes Dore than from other areas. On average specimens from Aubrac are larger than those from the Auvergne, they average 22.7 mm compared with 20.9 mm from Plomb du Cantal and 21.1 mm from Montes Dore. Figures 1 and 2, both from Puy de la Tache, show the range of individual variation in a locality.

Erebia manto D. & S.

This species is not so widespread as the previous two. I have only found it in the Montes Dore and the Cantals and it appears restricted to these areas as I know of no records from elsewhere in the Massif. In Montes Dore I have found it in Chaudfour (24th July, 1974) and on Puy de la Tache (22nd July, 1975), and in the Cantals on Plomb du Cantal (23rd July, 1975) and Puy Mary (12th August, 1975).

It occurs in the Massif as ssp. *constans* f. *gnathene*. Warren refers to this form as differing from normal *constans* from the Pyrenees "only in that in the male two apical rusty spots are present on the underside of the forewings; it is otherwise unmarked as in male *constans*. The female also has more pronounced markings on the underside of the forewings". As far as the males are concerned this is a bit of an over simpli-

fication. The markings on the underside of the forewings of male *gnathene* range from some with no red markings to others with a well developed row of red markings and a substantial area of red suffusion inside them. Most specimens have additional smaller spots as well as the two apical ones, thus forming an indistinct broken band on the forewings, and about half of them also have one or more small spots on the underside of the hindwings. It can be seen therefore that *gnathene* is rather better marked than Warren indicates. Female *gnathene* is comparable to the best marked female *constans*.

The size is variable and gives no firm guide, but on average *gnathene* is smaller than normal *constans*. My male series range between 17 and 20 mm and average 19 mm compared with 18 to 22 mm and average 20 mm for *constans* (Col du Tourmalet, Haute Pyr).

Erebia epiphron Knoch

This species occurs in two separate areas of the Massif, in the Montes Dore and Cantal in the north west and on Mont Aigoual in the south. From current literature its subspecific status in these areas is unclear. Warren (1936) lists ten subspecies of *epiphron*, four of which are relevant to the present consideration: ssp. *mackeri* Fuchs. from the Vosges, Auvergne and Pyrenees Orientales; ssp. *pyrenaica* H.-S. from the Pyrenees to the west of ssp. *mackeri*; ssp. *mnemon* Haw. from England and Scotland; and ssp. *aetherius* Esp. from most of the Alps.

De Lesse (1947) added to this by describing the particularly well marked form from Mont Canigou, PYR-OR, as ssp. *mackeri* f. *fauveaui*. At the same time he described *epiphron* from Mont Aigoual, not mentioned by Warren, as ssp. *pyrenaica* f. *cebennica* (in these descriptions de Lesse refers to "race" rather than "form" but the meaning appears to be the same).

In 1948 Warren revised his original opinion that English and Scottish specimens were a separate subspecies and concluded that they were in fact referable to ssp. *aetherius*. Warren's analysis in 1936 seems to have been accepted by subsequent authors until Higgins and Riley put forward a substantially different arrangement in 1970. They retain ssp. *mnemon* in England and Scotland and refer to specimens from the Vosges and Auvergne as "similar forms". In the Pyrenees they treat *fauveaui* as a subspecies in the east and consider those to the west as ssp. *aetherius*. Warren's two subspecies in the Pyrenees, *mackeri* and *pyrenaica* thus become Higgins and Riley's *fauveaui* and *aetherius*. This has led Bustillo and Rubio (1974) to list all four as subspecies that occur in the Pyrenees, an unlikely situation.

While no subsequent authors appear to have accepted Warren's revised view that British specimens are ssp. *aetherius*, it is interesting to note the results of a recent study by Cribb and Porter (1975) in which they say in relation to Warren's original view, "he states that this race (*mnemon*) is nearest to ssp. *mackeri* as the four spots on the forewings are all normally

present. Thus he maintains that it is related to the northern (Hartz Mts.) *epiphron* rather than the southern races (the *aetherius* of Esper from the central European Alps). Our own findings after a close examination of the Cumbrian and Perthshire races is at variance with this and it would appear that British *epiphron* is nearer to *aetherius* being poorly marked and less constant in its markings”.

While Cribb and Porter do not seem to have taken into account Warren's revised views, they do to some extent appear to confirm them.

In an endeavour to clarify the apparent confusion, at least in respect of the species in the Massif Central, I have examined my material from different localities in the Massif and as far as possible have compared it with material from other relevant areas.

Montes Dore. Males: 19 specimens (11 from Chaudfour and eight from Puy de la Tache), average forewing measurement 18.34 mm. Orange markings well developed on upperside. Most have four ocelli on the forewings (16 specimens), one has three ocelli and two have two. Upperside hindwings: 11 specimens have three ocelli, six have four, one has two and one has none. Some with three have a fourth orange marking with no ocellus. Underside: ocelli less well developed; forewings: 10 have four ocelli and the others lack ocelli in either spaces three or four.

Females: eight specimens, large and well marked, av. wing measurement 19.36 mm. Upperside: four ocelli on each wing. Underside: four ocelli on the forewings and three (six specimens) or four (two specimens) on the hindwings.

Cantal. Similar to those from Montes Dore but slightly smaller. Males: 10 specimens av. wing measurement 17.95 mm. Most have four ocelli on the forewings and three on the hindwings both upper and underside. Females: six specimens av. wing measurement 17.83 mm. Forewings: four ocelli on upper and underside. Hindwings: four ocelli upper and three underside.

Mont Aigoual. Males: much more poorly marked than those from the Auvergne. 23 specimens av. wing measurement 17.86 mm. Upperside: orange markings much reduced on the forewings and often completely absent on the hindwings. Most have only two ocelli on the forewings (15 specimens), four have four and four have three. Hindwings: half (11) have no ocelli, nine have three, one has two and two have one. Underside: ocelli equally reduced.

Females: seven specimens av. wing measurement 18.03 mm. Better marked than males. Four ocelli on the forewings and three on the hindwings. On the upperside they are similar to those from the Auvergne but the colouring on the underside is slightly different. On the forewings the band is more yellowish thus giving more contrast between it and the ground colour inside it. The rings round the ocelli on the hindwings are also paler than in Auvergne females.

(To be continued)